ISSUE 3 / 2012

DATEN – FAKTEN – ANALYSEN

CUTEC-News

AOP, IEPALT, ROBEHA, HOVEMAS

THE BIOFUEL WAVE: PEAKS AND TROUGHS

Draft legislation published by the EU in September would essentially signify an about face in European biofuel policy. Up to this point, the EU has provided massive support to promote the utilisation of biofuel in order to combat climate change. An EU Directive obliges the 27 member states to obtain at least 10% of the fuel which is used for transport from renewable sources by 2020. A radical change to that strategy could well be on the horizon. Scientific studies have shown that biofuels are by no means as climate friendly as had been previously assumed. There are also concerns that a constant increase in subsidised cultivation of food crops for fuel production could lead to food shortages over the long term or at least contribute to a drastic increase in food prices on world commodity markets when, for example, drought causes crop failure in the US as was the case this year. The new draft legislation would totally eliminate subsidies for fuel produced from beetroot, maize or cereals after 2020 and limit the proportion of fuel derived from food crops to 5% of total energy consumption in the transport sector. However to achieve the overall goal of 10% climate-friendly fuel by 2020, Brussels plans to encourage the production of fuel from algae and waste products. Here at CUTEC, we are very conscious of the ongoing "food vs. fuel" debate. We adopted a strategy some time ago which is very much in sync with the new EU policy, and we are concentrating our biofuel research activities on production from biomass residue. Nevertheless, the many 2nd generation fuel research projects which have been carried out should not suddenly be condemned. On the contrary, they actually deserve greater recognition, because we can build on many of those technologies. Today, syngas is produced from carbon dioxide and hydrogen which is extracted by electrolysis powered by wind energy. Using methane or Fischer-Tropsch synthesis, a broad range of hydrocarbons can be produced which in my opinion have the biggest future potential as a means of storing energy in gas or liquid form. In the Ems region of Germany, AUDI AG in partnership with SolarFuel is currently constructing a pilot e-gas plant. The goal is to make climate-neutral mobility a reality. Starting in 2013, the methanisation plant will convert excess wind energy into syngas as described above. The carbon dioxide will be supplied from the EWE biogas plant nearby. Construction of our new pilot-scale Fischer-Tropsch system puts us in an excellent position to take on a variety of biomass conversion and fuel synthesis research projects. The possible about-face by the EU is consistent with my observation that innovation waves are a feature of public policy. Massive funding in a particular field of research can be followed by a very deep trough. Fuel cells and solar research are two examples. It also appears to me that the wave frequency has increased in recent years. I would like to see greater continuity in research funding, because (to stick to the same metaphor) it is my view that long-frequency waves are more likely to generate genuine value-add for society.

Yours sincerely, Otto Carlowitz

ZINC RECYCLING BRINGS US ONE STEP CLOSER TO THE GREEN CAR

The Sustainability Management Cluster (CNM) at Environment Week, an event sponsored by the President of Germany

Photo: DBU-Archiv, Peter Himsel

German President Gauck during his opening address

Another positive experience for CUTEC: the Sustainability Management Cluster was on hand when German President Joachim Gauck opened the doors to the exhibition grounds at the Presidential Residence on June 5th and 6th. 15,000 invited guests from the public, business, scientific, social and media sectors attended the event. More than 500 applicants expressed an interest in taking part in this year's "Environment Week" exhibition. An independent jury selected 200 institutions and companies and invited them to put their new technologies, products and projects for sustainable resource management on display. Our cluster was one of them.

Visitors (including a German television crew) who came to the CUTEC stand had the opportunity to learn more about the latest developments in zinc recycling. A report on CUTEC's presence at Bellevue Palace had already appeared on German television the previous day.

CNM acts as the coordinator on the "Dezincing of Steel Scrap" research project sponsored by BMBF (Federal Ministry of Education and Research). Other members of the research consortium include the IFAD institute at Clausthal University of Technology and a number of leading industrial firms (Andritz Group/ Sundwig, Fritz Winter, Rohstoff-Handelsgesellschaft, Wolfsburg AG and Xstrata Zink). Their research activities make an important contribution to metal recycling.

Development of a new technique for recovering zinc from zinc-plated sheet metal scrap in the automotive industry is well worth the effort. Three million tonnes of additional zinc-plated scrap accumulate in Germany alone every year. The idea is based on a cold sulphuric acid bath. The dissolved zinc can subsequently be recovered using electrolysis at a zinc smelter. A further application is precipitation of the zinc as zinc sulphate. Moreover, de-zinced sheet metal scrap is a very high-grade raw material for the foundry industry.

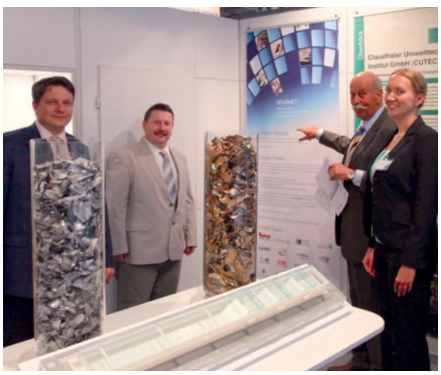
The new technology increases resource and energy efficiency by around 80% compared to the current process, enhancing the sustainability of the steel recycling process. The modular pilot line will provide a testbed to assess industrial scale feasibility. A car producer is planning to build a demonstration line. (kra)

CUTEC AT ACHEMA 2012 IN FRANKFURT

ACHEMA is the world's largest exhibition platform for chemical and environmental engineering and biotechnology. CUTEC was at the show in Frankfurt which was staged on June 18th – 22nd, 2012.

Knowledgeable visitors made their way to the CUTEC stand to learn more about ongoing projects and partnership opportunities. We shared information about current CNM (Sustainability Management Cluster) projects including closed-loop recycling in the steel industry (INAH*) and exploitation of mining dumps as a source of raw materials (ROBEHA*). Experts and students alike were very interested in the partnership with Brazil on the IEPALT Project (integration of spent pot liner from primary aluminium production into the aluminium recycling loop) which is receiving funding from the Ministry of Education and Research under the umbrella of the CLIENT programme. IFAD** gave a presentation on the Dezincing of Steel Scrap Project at the Congress which took place in conjunction with the conference. We took the opportunity to share information at the stand on the new REWIMET (strategic industrial metal recycling) research cluster.

In retrospect, we have every reason to be satisfied with our appearance at the event. We had a number of interesting discussions, took some new project ideas on board and were able to make new contacts. CUTEC was represented by members of the CNM Cluster team. The CUTEC trade show team did fine work in planning and organising the stand which provided an excellent operational base. (dm)



Presentation of the REWIMET research cluster at ACHEMA 2012

*INAH: Innovative processing and agglomeration of metallurgical residue I **IFAD: Institute of Mineral and Waste Processing, Waste Disposal and Geomechanics at Clausthal University of Technology I ROBEHA: see Page 3

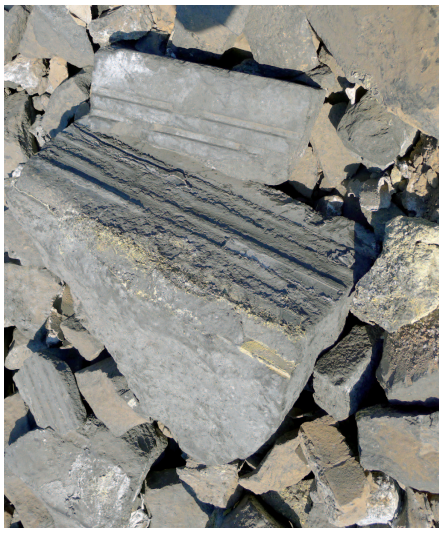
SUSTAINABILITY MANAGEMENT CLUSTER: RIGHT ON TRACK

Efforts by the Sustainability Management Cluster (CNM) to enhance resource efficiency remain on track. The development of innovative process flows depends to a very significant extent on intensive partnerships with SMEs and large companies. Two of the most recent examples are the **IEPALT** and **ROBEHA** projects which recently got underway and are described briefly below.

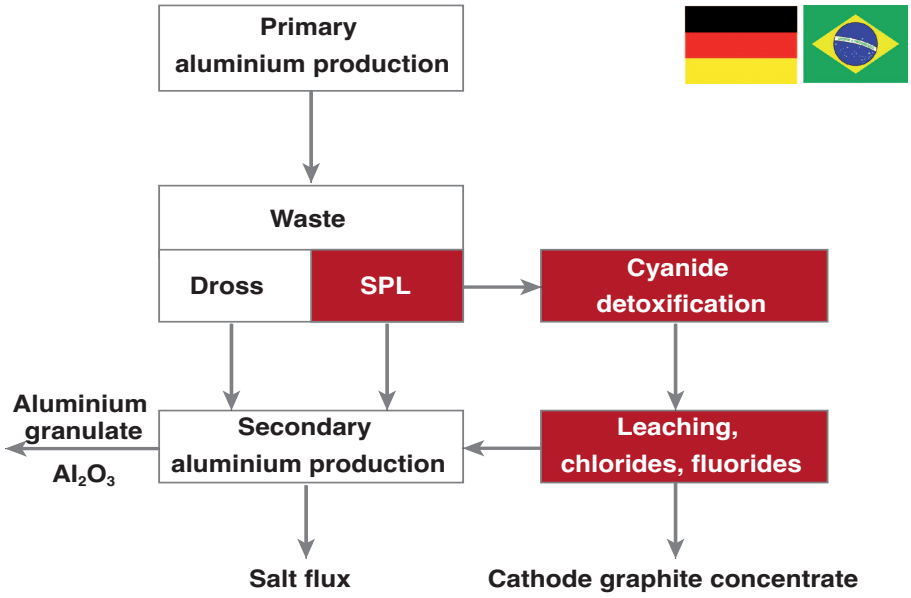
Bundesministerium für Bildung und Forschung

IEPALT stands for integration of spent pot liner from primary aluminium production into the aluminium recycling loop. Funding is provided by the Ministry of Education and Research under the umbrella of the CLIENT** Initiative, Topic Area 2: Resource utilisation with particular emphasis on production-integrated environmental protection and closed-loop recycling. Our partner country is Brazil.

The challenge is as follows. During production and refining of aluminium (Al), the lining of the electrolytic cells periodically have to be completely removed and replaced. The technical term for this material is SPL (spent pot liner). It consists of a refractory insulation layer covered by a layer of graphite, and it acts as the cathode in fused-salt electrolysis. Because SPL contains fluorides and cyanides, it poses an environmental hazard, creating problems for our partner country Brazil as well. The photo shows an SPL dump site. The substances are water soluble, creating the risk of groundwater contamination.



SPL dump



Integration of SPL processing into the existing aluminium cycle

Our partner country Brazil is keenly interested in the development of a process for completely recycling SPL residue. Germany is mainly focusing on resource-efficient Al production and a possible reduction in CO_2. For every tonne of Al produced, up to 40 kg of SPL is left behind. The 36.9 million tonnes produced in a year worldwide (2009) result in an annual accumulation of 1.5 million tonnes of SPL.

The technical objective is to develop a new technique for complete recycling of SPL (refractories and graphite) from fused-salt electrolysis in primary aluminium production without leaving any residue behind.

The technique supports the higher-level goal of sustainability. Reduced consumption of primary raw materials and improved energy efficiency are two of the most prominent factors. The illustration above shows integration of SPL processing into the existing aluminium cycle.

The innovative process will be developed up to pilot scale. Supplemental research aimed specifically at market introduction based on scenario development will make a major contribution to achievement of industrial feasibility. Because the aluminium industry and SMEs (particularly in the innovative services sector) are closely involved, the probability of success from the technical and commercial perspective looks very promising for Brazilian and German companies. Following project completion, the process will be handed over for upscaling in an industrial demonstration plant, setting the scientific and engineering standard.

CNM is the consortium coordinator on the 3-year international project.

The scientific partners on the joint project:

- Clausthal University of Technology, Institute of Mineral and Waste Processing, Waste Disposal and Geomechanics
- Evol (SME, Germany)
- LSL (SME, Germany)
- RCE (SME, Germany)
- Hydro Aluminium Rolled Products (Germany)
- Recicla Alumínio Ltda., Aracariguama, Brazil
- Universidade Luterana do Brasil, Canoas, Brazil

Associated partners

- Trimet Aluminium (Germany)
- Albras Aluminio Brasileiro S/A, Barcarena, Para, Brazil
- Alcoa Aluminio SA, Pocos de Caldas, Minas Gerais, Brazil

Continued on page 5

*SME: Small and medium enterprises I **CLIENT: International partnerships for sustainable climate protection and environmental technologies and services

RATIOTECH – PYROLYSIS CHP PLANT

The German company Ratiotech is developing pyrolysis technology which is intended to make small CHP plants up to about 50 kWel economically viable. The process produces high-quality syngas at around 900°C in a tin bath as a heat transfer medium. The plan is to process biological waste and residue, so that priceless natural landscapes are not destroyed by converting them to agricultural use. Agricultural food production would also not be affected.

Once engineering enhancements have been made to the Ratiotech equipment during the initial project phase, 48-hour tests will be run with wood as well as with straw to assess functionality. Gas purification will need to be included in the design to manage chemically challenging biomass such as straw. With the Ratiotech process, the ash contains a certain amount of tin that is discharged with the gas. A feasible technique will have to be found to recover the tin. Development work on a chemical-physical system-level process model is already underway at CUTEC.

IMPPRINT

Published by:
CUTEC-Institut GmbH
Editor: Dr. T. Heere (he)
Contributors:
Prof. Dr.-Ing. O. Carlowitz (ca)
Dr. T. Heere (he)
Dipl.-Ing. H. Bormann (bo)
Dipl.-Ing. R.-U. Dietrich (di)
Dipl.-Ing. A. Dittmar (dm)
Dipl.-Ing. A. Grove (gro)
Dipl.-Ing. C. Immisch (im)
Dr.-Ing. B. Kragert (kra)
Dipl.-Ing. A. Niedermeiser (ni)
Dr. S. Meyer (me)
Dipl.-Ing. F. Müller (mu)
Dipl.-Kaufm. A. Sauter (sr)
Dipl.-Ing. N. Senkel (sk)
Dipl.-Ing. W. Siemers (sie)
Dipl.-Ing. C. Szepanski (sz)
Dr. T. Zeller (ze)
Layout and typesetting:
G. Wessels (wes)
Production and supply:
CUTEC-Institut GmbH
Leibnizstr. 21+23
38678 Clausthal-Zellerfeld
Phone +49 5323 933-0
Fax +49 5323 933-100
E-Mail: cutec@cutec.de
Internet: www.cutec.de
Publication:
Several times a year at irregular intervals. Issues can be ordered from the address above at no charge.
Send an E-mail to:
cutec-news@cutec.de

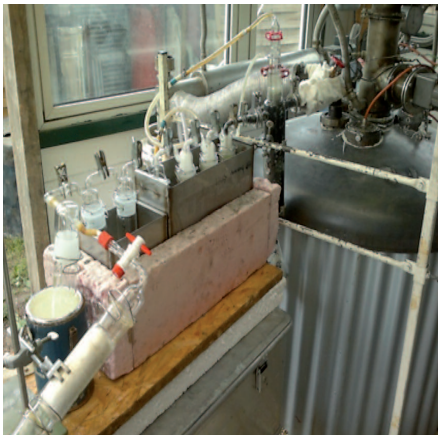
Ratiotech pyrolysis test bed

Heating tubes have now been included to optimise heat transfer. The design of the reactor vessel was modified to increase durability, and new insulation has substantially reduced heat loss. All of these modifications improved the system to the point where a 36-hour test could be run. The gas was analysed using CUTEC's own online analysis equipment. Under optimal operating conditions, hydrogen content was 40% v/v – 50% v/v on a repeated basis. The carbon dioxide content was 35% v/v. By optimising the operating mode, the tar content in the raw gas was reduced significantly from an initial 22.8 g/Nm³ to 1.8 g/Nm³. As this is still too high for use in a gas engine, gas purification and tar removal which are appropriately dimensioned for this small, compact system will be needed as well. A cooling screw running in a water bath and a biodiesel filter are currently being used. With this simple gas purification method, the tar removal rate was around 94% in the high-tar mode of operation. If similar separation rates can be achieved when the pyrolysis reactor is running in the optimised mode, the tar content in the purified gas may well be around 0.1 g/Nm³ which meets gas motor standards. It should become clear during the next week of trials whether or not that is the case. Simultaneous removal of dust and tar from the gas by using a wet electrical precipitator is being considered as an alternative. The collecting electrode would then be rinsed free with biodiesel/RME. The tar-laden RME can be used for pilot injection in the gas engine or as an additional source of process heat without losing the calorific value of the tar. The tin can be recovered electrochemically. A promising approach has been developed through contacts with the Clausthal University of Technology Institute of Mineral and Waste Processing, Waste Disposal and Geomechanics (IFAD) and the CUTEC Sustainability Management Cluster.

Calculations which take the gas purification stages into account are being run on the chemical-physical model to compare gas engines and fuel cells. Particularly in the low power capacity range, fuel cells appear to be more efficient.

Because biomass consumption per CHP system is so low, the feedstock can be obtained locally or even on-site. Farmers as well as industrial and small-scale companies that are looking for a source of heat and electricity are potential users of this technology. Due to the more compact design, the system currently under development is ideal for SMEs.

Funding for the project is being provided by DBU (German Environment Foundation - FKZ 29449-24/0). (mu)



Tar sampling at the pyrolysis system

Continuation from page 3

SUSTAINABILITY MANAGEMENT CLUSTER: RIGHT ON TRACK

Overburden dump in the Upper Harz deposit

Bundesministerium für Bildung und Forschung

ROBEHA is an urban mining project. The objective is to exploit mining and metallurgical dumps as a source of raw material. Sustainability is a key consideration, and the Western Harz region will be used as an example. The Ministry of Education and Research is funding this project as part of the r³ programme for innovative technologies for resource efficiency – strategic metals and minerals. The term urban mining refers to the orderly dismantling of anthropogenic raw material deposits such as buildings and infrastructure.

The sub-heading of landfill mining refers specifically to the utilisation of raw material from waste disposal sites and mining and metallurgical dumps.

Rapid growth in emerging countries is creating increased demand for raw materials and is driving up the price of those materials. This in turn offsets the high cost of recovering secondary raw materials from dump sites. Landfill mining is being intensified. The current state of the raw materials markets makes dump sites with sufficient value metal content, such as those found in the Western Harz region, increasingly attractive. The residue heaps left over from non-ferrous metal production can be divided into three categories depending on their origin. The materials they contain can differ.

Overburden dumps consist of sedimentary adjacent rock, ore-free gangue and residual ore. Ore not deemed at the time to contain sufficient metal to make extraction economical is also included in this category.

Tailing dumps have essentially the same material content as overburden. Flotation ponds, which are relatively rare, are a special case and have a somewhat different mineral profile.

Slag dumps primarily contain oxides. The main categories are lead, copper and iron slag heaps.

The photo above shows a section of an overburden dump.

During the course of this 3-year project, the Sustainability Management Cluster working alongside of the Clausthal University of Technology IFAD Institute and the private sector firm Dorfner Anzaplan will be looking particularly at processing techniques which were not available at the time the dumps were formed. In combination with new process flows which will be developed, the techniques will be adapted and if necessary modified for use specifically with the existing materials and some new target substances as well.

The illustration below shows the basic approach used for the investigations.

The techniques which are suitable for processing the dumps will then be consolidated into an expert system.

The scientific partners on the joint project:

- Federal Institute for Geosciences and Natural Resources (BGR)
- RWTH Aachen, Department of Waste Management (LFA)
- Clausthal University of Technology, Institute of Mineral and Waste Processing, Waste Disposal and Geomechanics (IFAD)

SME partners:

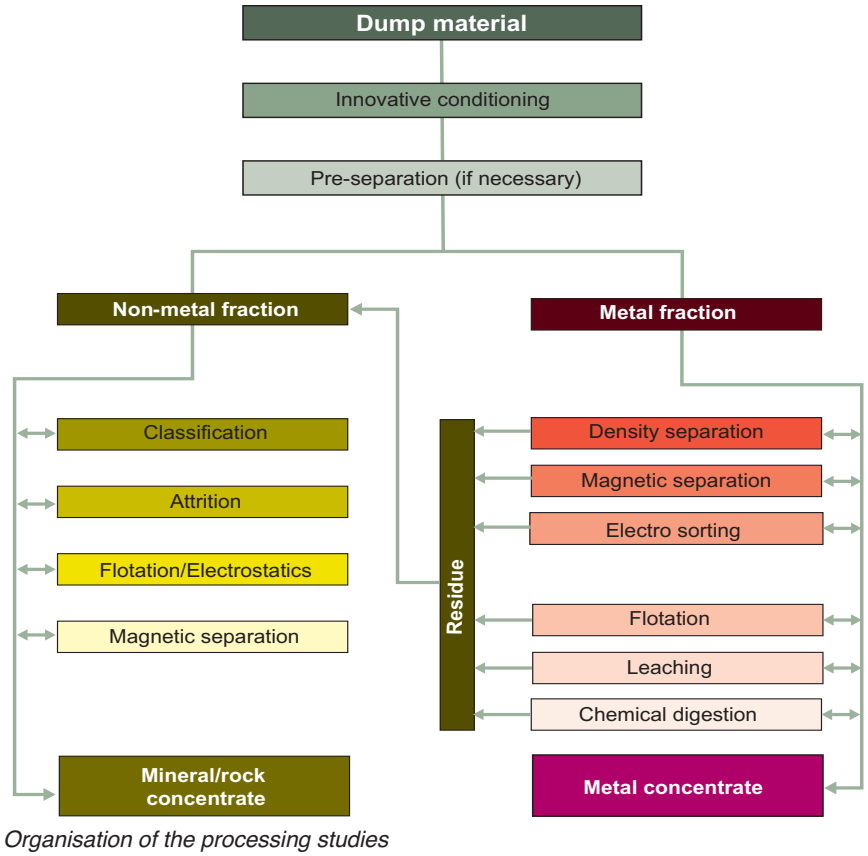
- Dorfner Analysis Centre and Engineering Services
- Prof. Burmeier Engineering Services (consortium coordinator)

Associated industrial partners:

- Xstrata Zink
- Aurubis
- PPM Pure Metals

Breaking news received after the editorial deadline:

CNM has acquired a project entitled “Innovative Techniques for High-Quality Recycling of Magnesium Shavings” (HOVEMAS) from the Ministry of Education and Research (BMBF). (ze/sr)



Organisation of the processing studies

DEVELOPMENT, OPTIMISATION AND TEST OF A NEW APPROACH TO GRIT CHAMBER DESIGN

Pilot grit removal system at the CUTEC Test Centre

Municipal water treatment plants normally have an aerated grit chamber which is divided into grit removal and grease separation chambers. Grit sedimentation takes place under low flow conditions. Aeration generates a rolling motion and promotes flotation of grease and suspended matter which are removed near the surface. In real-world applications, aeration often creates strong turbulence and as a result fine grit is not removed to the desired extent. Short-circuit flow and suboptimal inlet design can also reduce performance. With this in mind and to minimise energy consumption, FlowConcept has developed a new type of grit chamber design with the aid of high-resolution computer-based simulation (CFD). The concept is based on the segregation of grease and grit removal to ensure that the two process steps can take place without interfering with each other. For grit removal, the water is fed tangentially into the tank to create a roll-action flow. The tank is rounded so that the rolling flow can be maintained without additional energy input (aeration). The role of CUTEC on the joint project which is funded by the German Environment Foundation was to build a 1:7 scale prototype based on the FlowConcept grit removal simulation model and conduct trials to verify the model. The illustration at the right shows the test bed at the CUTEC Test Centre. CUTEC and FlowConcept will then review the results of the trials and decide what modifications should be made to the prototype design and mode of operation. The combination of computer simulation and test bed trials will enable the team to optimize the design and achieve good separation performance. Trials will be run with artificial waste water (water-sand mixture) at the Test Centre as well as with real waste water. To do that, the trial system will be moved to a municipal water treatment plant in 2012 where it will operate in bypass mode with ongoing conventional grit removal. Once the prototype trials are complete, an operational system based on the design concept will be built and installed at a waste treatment plant which has expressed an interest in the technology. Using this installation as a reference site, our project partner FlowConcept then plans to market the technology in Germany and neighbouring European countries. (bo)

20th European Biomass Conference in Milan

The 20th EU BC&E (Biomass Conference & Exhibition) took place in Milan, Italy on June 18th - 22nd, 2012. The programme included more than 800 plenary, oral and poster presentations. The conference provided an in-depth insight into the complex world of bioenergy. Biomass experts from more than 60 countries made the trip to Milan. CUTEC gave a presentation on the integration of biogas production into a higher-level energy management system to compensate for fluctuations in wind and hydroelectric generation. CUTEC also displayed a poster by Ms. Senkel from the Energy Systems cluster on the current status of the HTBioStir* Project. (sk)

6TH INTERNATIONAL WASTE WATER TREATMENT CONFERENCE

Over the years, the visitors who attended previous conferences have formed a close-knit community, and the response was excellent again this time around. Approximately 180 experts from 33 countries got together again on May 7th – 9th, 2012 in Goslar, Germany to attend the 6th international AOP (Advanced Oxidation Processes) conference on oxidation technologies for waste water treatment. The Scientific Committee reviewed roughly 180 abstracts that were submitted. Leading experts shared information on their latest results and innovations in 34 talks and 110 poster presentations at the event.

Trace pollutants continue to be a major issue and they were one of the main items on the agenda. Ozonation and UV oxidation were highlighted as particularly important techniques during the discussions.

The industrial exhibition was also organised parallely which was an an additional dimension to the intensive exchange of information between the scientific academic and business communities. At the personal level, the conference provided an ideal platform for the company's teams to establish new business contacts.

We would like to thank our sponsors (Anseros Klaus Nonnenmacher, Solvay Chemicals and Xylem Water Solutions) for their support which in some cases goes back many years. Without them, it would not be possible for the organisers, led by CUTEC in partnership with the IWA (International Water Association) and the Technical Universities of Berlin and Clausthal , to stage these successful events.

Once again, the experts who attended the conference gave a very positive feedback and indicated that they would be satisfied with nothing less than a save the date notice for AOP7 2015 in Goslar. (kra/nie)

View of the auditorium at AOP6

*Development of a high-temperature heat exchanger for connecting biomass boilers to Sterling machines

OLICARBON – ACTIVATED CARBON FOR WATER TREATMENT FROM PYROLYSIS OF OLIVE STONES

Competing usage is putting increasing pressure on traditional sources of activated carbon such as wood, peat, nutshells, lignite and anthracite. Olive stones, a by-product of olive and olive oil production in Southern Europe, have been identified as an alternative. Olive stones are available in sufficient quantities, and they have a high carbon content as well as sufficient mechanical stability for subsequent recycling.

Activated carbon made of olive stones for gas phase applications is already available on the market. Those types of activated carbon are however unsuitable for drinking water purification. Anthracite-based adsorbents are currently used at municipal water plants for purification of the raw water. The search is now on for renewables as a potential replacement for fossil resources. The requirements profile for activated carbon in water treatment continues to expand. Increasing levels of pharmaceutical residue and other newly defined substances are adding to the challenge. Sufficient wetting of the activated carbon particles and minimisation of the floating fraction are essential parameters.

The overall goal of the project is the development of a process for cost-effective production of high-performance activated carbon from olive stones using rotary kiln pyrolysis. The project deliverables include definition of requirements for the solid product, the process and the processing equipment as well as experimental development and process definition up to the point where it is possible to generate the conceptual design of a pilot system.

The role of CUTEC is to scientifically clarify how olive stones can be converted to sophisticated activated carbon for use at water treatment plants. The remit includes the scientific definition of significant process parameters for the preparation, carbonisation and activation stages as well as development and optimisation of the production process based on trials at the Test Centre.

The Cologne-based project partner TechTrade has made a batch rotary kiln available for the initial project phase. The CUTEC rotary kiln will be used for pilot-scale development work. The role of TechTrade on the project is participation in the development of an ecologically advanced process, evaluation of the effectiveness of CUTEC intermediates for water purification and engineering of the pyrolysis rotary kiln. When the development work is complete, the intention is to create an expert system to predict the product characteristics of activated carbon as a function of the production process. The partner will then be able to use this tool during design of the pyrolysis process. The project is being funded by the Federal Ministry of Economics and Technology through the German Federation of Industrial Research Association's Central SME Innovation Programme (ZIM). (gro)

Olives from Southern Europe: the stones are a by-product of olive and olive oil production, and they are available in large quantities

REPRESENTING CUTEC ON THE ROAD

Hannover Messe Industrie 2012

As was the case in 2011, CUTEC made an appearance at the joint Energy from Lower Saxony stand on April 23rd – 27th, 2012. Besides providing a general overview, our main emphasis was on the generation of electricity from biomass. We put our SOFC demonstrator on display at the stand. In addition, the CUTEC and the Energy Transition brochure was presented to the general public for the first time. The brochure contains information on some typical CUTEC energy projects. We welcomed some interesting visitors at the stand, engaged in productive discussions and made a number of useful contacts. We had fewer visitors than last year, but that seems to have been the general trend at the show in Hannover. There seem to be too many international and national energy shows and exhibitions. (sie)

19th BMWi SME Innovation Day

On June 14th 2012, the CUTEC Physical and Biological Process Technology Department made an appearance at the 19th BMWi (Federal Ministry of Economics and Technology) SME Innovation Day event at Aif Projekt in Berlin. At this year's exhibition, more than 300 companies and research institutions presented around 200 products, processes and services which have been developed under the umbrella of the SME Innovation programme (ZIM) and the joint industrial R&D programme (IGF). At the joint stand which CUTEC organised together with its project partner Dauborn MembranSysteme, more than 1500 visitors who attended the event had the opportunity to learn more about a new technique for increasing the efficiency of biogas plants based on a new membrane filtration system. The event provided a platform for numerous interesting discussions and the department gathered some new ideas for future project work. (bo)

REPRESENTING CUTEC ON THE ROAD

Various events in review

Biomass conferences in London and Jönköping

At the invitation of the organiser, a presentation was given at the European Biomass to Power conference on April 11th and 12th in London. The title of the presentation was Cogeneration and additional Biomass Feedstock for Power Generation in the Jamaican Sugar Industry. A noteworthy development and something new on the agenda was the attention given to pellets and possibly torrefied pellets for co-firing in coal-fired power stations. Due to applicable regulations, this process takes place largely outside of Germany.

The 2012 World Bioenergy conference was staged in Jönköping, Sweden on May 29th – 31st. CUTEC was represented by Mr. Siemers who gave a presentation on the combination of solid biomass combustion and stirling technology as part of the HTBioStir project. The conference was accompanied by a biomass exhibition. In contrast to Hannover Messe, this event was more strongly focused on biomass, and it provided a good overview of Northern Europe and the rest of the world. As an added benefit, the event provided the opportunity to visit some sites on the journey to and from the location where the conference was held in Central Sweden which is admittedly somewhat remote. (sie)

International Fuel Cell Conference in Lucerne

The 10th International Fuel Cell Conference, the highlight in the world of fuel cell research, was held on June 26th – 29th in sunny Lucerne. In front of a large audience, Dr. Lindermeir shared information on the project aimed at the use of SOFCs to generate electricity from biogas. Mr Szepanski and Mr Immisch had the opportunity to give poster presentations about their current projects on an autonomous SOFC system and anode gas recycling using a hot-gas injector and to talk shop with researchers from around the world. Mr Dietrich cultivated our good international contacts. Overall, CUTEC was very well represented and from our perspective the event was a complete success. (sz/im)

VDI 2012 Emissions Reduction Conference in Nuremberg

CUTEC was represented at the Emissions Reduction Conference in Nuremberg on June 19th and 20th which attracted 120 visitors.

At the stand, we shared information on the paragraph 26 (Federal Emissions Control Act) measurement station and the Thermal Process Technology Department including the Stationary Exhaust Gas Cleaning Working Group. The results of two projects were used as examples to show how CUTEC approaches optimisation and energy conservation in industrial processing. The first project (in partnership with LTB) was aimed at the development and testing of exhaust gas purification technology for car body drying. The project team wanted to reduce primary energy consumption while retaining most of the existing equipment. The other project (in partnership with Crone Wärmetechnik) involved systematic development of energy-saving paint drying technology for car body production based on exhaust air volume flow control. A scale-model was used to demonstrate the process equipment used in new innovative RTO technology for thermal exhaust gas purification of air containing silicon organic compounds.

In addition to our presence at the stand, CUTEC also contributed to the current debate on emissions reduction strategies by giving talks and poster presentations. At the VOC session under the direction of Prof. Dr.-Ing. Otto Carlowitz, Dipl.-Ing. Olaf Neese presented possible approaches for resolving the conflicting goals of emissions reduction and increased energy efficiency using paint drying systems in the car industry as an example.

Poster presentations by Dipl.-Ing. Torsten Reindorf and Dipl.-Ing. Lukasz Piech were on display. Reindorf highlighted ways of optimising the rinsing process in thermal oxidation systems with regenerative exhaust air preheating, and Piech shared information on new burner technology for thermal oxidation (TO) systems. The CUTEC contribution was well received. (me)

Project presentation at the World Hydrogen Energy Conference in Toronto

The international hydrogen and fuel cell community made the journey to Toronto to take part in the World Hydrogen Energy Conference on June 3rd – 7th. The event which was staged for the 19th time attracted more than 1200 participants. In six tracks running in parallel, advocates of the hydrogen economy reported on achievements since the last conference in Essen in 2010 and highlighted challenges which remain on the road to market introduction. The car industry continues to invest significant sums in the technology. The power generation and traditional hydrogen supply industries are also making a major contribution to a paradigm shift. They are promoting commercially disciplined market development featuring enhanced fuel cell energy density, continuous cost reduction, increased customer benefit and the forging of strong industry partnerships.

CUTEC's Anode Offgas Recycling to improve Electrical Efficiency of a kW-class Solid Oxide Fuel Cell System using Propane Fuel was selected from among the 900 abstracts which were submitted. This gave us the opportunity to present the interim results of our AiF project (see CUTEC News issue 3/2010). At the special SOFC session, our contribution as well as the presentations by the University of Warsaw (Poland), the German Aerospace Agency (DLR), the Freiberg Mining Academy (Germany) and the Aragon Hydrogen Foundation (Spain) were well received. The anode gas recycling system, the advances in hot gas injection technology and the overall system conceptual design featuring a 1.4 kW ISM* module by our project partner staxera generated considerable interest. CUTEC now has an international reputation as an SOFC system development partner and we will continue to enhance that position in the years to come. (di)

* Integrated stack module